CLAIMS

1. A magnetic resonance imaging (MRI) device, comprising:

an inner gradient coil assembly proximate a patient positioning area;

an outer gradient coil assembly proximate a magnet assembly; and

a damping layer sandwiched between said inner and outer gradient coil assemblies.

2. The MRI device of claim 1, wherein said damping layer comprises at least one high modulus cylinder sandwiched between two viscoelastic layers.

3. The MRI device of claim 2, wherein said high modulus cylinder is composed of at least one of ceramic, glass filament wound tube, carbon fiber, and another non-conductive material exhibiting a high modulus.

4. The MRI device of claim 2, wherein each of said viscoelastic layers is composed of at least one of rubber, foam, and another material having a high damping coefficient.

5. The MRI device of claim 1, further comprising at least one additional damping layer positioned between said outer gradient coil assembly and said magnet assembly.

6. The MRI device of claim 1, further comprising at least one additional damping layer positioned between said inner gradient coil assembly and said patient positioning area.

7. The MRI device of claim 1, wherein said damping layer comprises a plurality of high modulus cylinders, and wherein each of said plurality of high modulus cylinders is positioned between at least two viscoelastic layers.

8. The MRI device of claim 1, wherein said inner gradient coil assembly generates a magnetic field gradient in response to the presence of a magnetic field generated by said magnet assembly; and wherein said outer gradient coil assembly shields the magnetic field gradient generated by said inner gradient coil assembly from radiating outwardly from the MRI device.

9. A method of manufacturing a magnetic resonance imaging (MRI) device, comprising:

forming a space between a first gradient coil assembly and a second gradient coil assembly;

pouring a liquid viscoelastic material into the space;

allowing the liquid viscoelastic material to solidfy within the space in order to form a damping layer between the first gradient coil assembly and the second gradient coil assembly.

10. The method of claim 9, further comprising positioning at least one high modulus cylinder in the space before said pouring step.

11. The method of claim 9, wherein the liquid viscoelastic material is at least one of rubber and foam.

12. The method of claim 10, wherein the high modulus cylinder is at least one of ceramic, glass filament wound tube, and carbon fiber.

13. The method of claim 9, further comprising positioning plurality of high modulus cylinders in the space such that each of the plurality of high modulus cylinder does not directly contact another high modulus cylinder, the first gradient coil, and the second gradient coil.

14. A magnetic resonance imaging (MRI) device, comprising:

a magnet assembly for generating a magnetic field;

a patient positioning area;

a first gradient coil assembly proximate said patient positioning area configured to produce a magnetic field gradient in response to the presence of a magnetic field generated by said magnet assembly;

a second gradient coil assembly proximate said magnet assembly configured to block the magnetic field gradient generated by said first gradient coil assembly from radiating outwardly from the MRI device; and

a damping layer sandwiched between said first and second gradient coil assemblies, wherein said damping layer comprises at least one high modulus cylinder sandwiched between two viscoelastic layers.

15. The MRI device of claim 14, wherein said high modulus cylinder is composed of at least one of ceramic, glass filament wound tube, and carbon fiber.

16. The MRI device of claim 14, wherein each of said viscoelastic layers is composed of at least one of rubber and foam.

17. The MRI device of claim 14, further comprising at least one additional damping layer positioned between said second gradient coil assembly and said magnet assembly.

18. The MRI device of claim 14, further comprising at least one additional damping layer positioned between said first gradient coil assembly and said patient positioning area.

19. The MRI device of claim 14, wherein said damping layer comprises a plurality of high modulus cylinders, and wherein each of said plurality of high modulus cylinders is positioned between at least two viscoelastic layers.

20. The MRI device of claim 14, further comprising a radiofrequency (RF) coil assembly configured to transmit a radiofrequency pulse and detect a plurality of MR signals induced from a subject being imaged.